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ABSTRACT

This report reviews evaluations of two instructional systems that the faculty of the College of Agriculture, University of Illinois, are now using in their extramural teaching. The systems are (1) "Univex Net," which transmits audio and visual signals via telephone lines from one campus classroom to another classroom located somewhere else in the state, and (2) auto-tutorial carrel units which provide for independent study. A combination of the auto-tutorial and the Univex system is also evaluated. The evaluations are learner oriented. Attitude was measured with the Illinois Course Evaluation Questionnaire. Actual performance was measured by grades and specific criteria for success in obtaining educational objectives. (The questionnaire and four references are included.) (author/ly)

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Instructional Systems for Extramural Courses

Jack C. Everly*

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During the past decade the concept of an instructional system has been offered as the great promise for the solution of complex adult education training problems. The use of the systems approach for extramural instruction poses a valid research problem regarding the effectiveness of such systems and their impact on the learner, the teacher and the educational institution that uses them. The opportunity to seek answers to such questions presented itself when the College of Agriculture, University of Illinois started teaching extramural courses by the UNIVEX NET in the fall of 1968.

The UNIVEX NET is an educational system developed by the Division of University Extension that provides extramural courses by telephone to educational centers throughout Illinois. Each center instantaneously receives both written and voice communication from the instructor. In addition, each student in the off-campus class has the ability to write and speak to the instructor or his classmates at different locations. Thus, all elements of a normal classroom are present except the physical presence of the instructor.

One point needs to be clarified. Most systems acquire the name of the media or hardware of the system. Media are not instructional systems but the tools by which the instructor and his institution can facilitate the greatest of all acts of communication ... that of an instructor with his student and between the student and his instructor. It is this act of communication that we should attempt to research not the hardware. However, we must recognize that the hardware facilitates the development of complex instructional systems which heightens the impact of the instructor in controlling the instructional system of which he is a part.

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If "instructional" can be defined as those elements which promote learning and "system" defined as the many components unified as an entity to make possible a process, then, for research purposes an instructional system can be defined as that entity which makes possible the process of education for any given subject matter.

A basic assumption can be made that there is nothing in an instructional system, of and by itself, which produces improved learning by the participant. If poor instruction is fed into the system, it is still poor instruction when it reaches the student. If the learner is not capable of learning, the system can do nothing about his capabilities.

It is difficult to cut-up an on-going instructional system into meaningful variables. If this is attempted in a typical experimental design, the system itself is destroyed and the sum of the parts are much different than the whole. Another limiting factor is that students and instructors will not be manipulated like varieties of corn, pigs or cattle in order to create the proper experimental design to measure the contribution of such variables as the hardware, software and the learning environment.

Thus, the researchable questions must deal with a system at work. Research tools must be limited to those useful in conducting field research and case study research. Conclusions from such investigations must be limited to a specific system, perhaps to a particular kind of classroom and to a particular kind of student, for a particular kind of hardware and software and for a specific instructor. Thus, the results are not expected to be generalizable to other instructional systems. However, they may be useful as guidelines in evaluating the performance of other systems.

With the current popularity of teacher evaluation and the availability of proven test instruments, it soon became apparent that this would be a fruitful approach. Others support this rationale.

Tyler (2) indicates:

> Students can report on their interest in the course, on their understanding of what is expected of them, on their satisfaction with achievement in the field, on the amount and extent of their study, and the like. There are, of course, other important aspects of teaching which the students are not in good position to judge, such as the soundness of the objectives, the validity of the reference material provided, the relevance of the approach. On the whole, however, it has been found that the summation of student judgements obtained from a questionnaire is positively correlated with other evidences of effectiveness of teaching....

It is in Wientge's (4) documentation of "Adult Teacher Self-Improvement Through Evaluation of Students" that the research value of rating scales can be seen. His use of such rating scales in an instructor rating form lead to the conclusion that the Illinois Course Evaluation Questionnaire developed by Richard Spencer and Lawrence Aleamoni (1) would be a logical research instrument. Wecke (3) reports the successful use of the CEQ with extramural courses, also.

Spencer and Aleamoni assume that if one does in fact change student behavior, in the specified direction, as a result of an instructional system, then that system has been effective. If that system has been effective then there could be a large number of elements in that system contributing to its effectiveness, such as the instructor, textbook, homework, course content, method of instruction, student interest, student attention, general student attitude towards the course, etc. Assuming that all of the elements directly or indirectly affect student behavior in a course, and assuming that students

are the only ones who are constantly exposed to those elements, they appear to be the most logical evaluators of the quality and effectiveness of the instructional system.

The 50 item CEQ is scored using a weighted point system, under the assumption that students who indicate strong responses to questionnaire items should be differentiated from those whose responses tend to be more moderate. All responses to the CEQ items are based on a common scale, from Strongly agree (SA), through agree (A), to disagree (D), and strongly disagree (SD). There is no neutral position. A positive and a negative item expressing roughly the same concept form a pair. The scoring of these items in match pairs is useful in identifying the "careless" student responses. An example of these pairs is Item #6 "More courses should be taught this way" and Item #37 "I would prefer a different method of instruction."

Factor analysis (Thurstone, 1947) was used by Spencer and Aleamoni to determine the six sub-scores:

Factors Obtained from the Final 50 Item Questionnaire (1)

	Factor (Sub-Score)	Number of Items In the Factor	% Variance
I	General Course Attitude	8	30
II	Method of Instruction	8	6
III	Course Content	8	5
IV	Interest and Attention	8	4
V	Instructors	8	3
VI	Other	10	3

In checking the reliability of the sub-scores, Spencer and Aleamori concluded that general course attitude, method of instruction, interest and attention and instructors were considered acceptable. The items defining content and other sub-scores were the least reliable. They indicate that a few of the content items correlated with general items, which explains the lower internal consistency of these items.

In the scoring procedure, the average item response is computed for each item for a given instructional system (class). The instructor's mean by item is then compared to the total results across all sections tested in the standardization population and decile norms are printed for each item mean. A total score and a set of sub-scores are also computed and presented in the computer print out report. The total score is the mean response over all questionnaire items. The sub-scores represent definite areas in an instructional program that can be considered relatively independent from each other. For example, the content of a course may be rated by the students as good while the method of instruction may be considered poor.

To date, approximately 250 courses with a total in excess of 100,000 students represent the University of Illinois normative population. Normative data for each item, expressed in deciles, is based upon the responses of the total normative population whereas the normative data for the sub-scores is also reported by department, course level, rank of instructor, etc.

The Illinois Course Evaluation Questionnaire is simple to use. Copies are printed on a Digitek Answer sheet and supplied by the Measurment and Research Division of the Office of Instructional Resources at the University of Illinois. Each student responds by marking directly on his own answer sheet with a conventional graphic pencil. It normally takes about 10 minutes for completion. Administration of the questionnaire is supervised by the course moderator or

test proctor at each educational center on the UNIVEX NET and the completed forms are inserted into an envelope for mailing to the researcher prior to administration of the final exam.

From the returned forms the following is produced:

A. A print-out which indicates average sub-test and total scores, and the norm decile.

B. A print-out which includes specific item responses, their means and the norm decile.

Pioneers in our efforts with the instructional system involving the UNIVEX NET were two instructors in Agronomy during the 1968 fall semester. This gave us a unique opportunity to observe graduate-level student attitudes about this course in four different locations, two of which would be on the UNIVEX NET and one conventional classroom on campus and one extramural classroom located 150 miles from the campus to which the instructor travelled each week to meet the class. Instructor A taught this extramural course in person. According to student attitudes as measured by the Course Evaluation Questionnaire, this was the best rated course, with the UNIVEX NET course at Malta in second position and the UNIVEX NET course at Freeport in third with the on-campus course in last position. Note that for Instructor B, his highest rating came from a UNIVEX NET location. In this assessment from the CEQ results we note a difference in instructors and location. A surprising evaluation of instructor attitude indicates that Instructor B gained a great deal more satisfaction from "face-to-face" teaching than from the impersonal teaching through UNIVEX, yet his best rating came from a UNIVEX location, which was even better than Instructor A. The rating at Freeport was significantly lower than the other three locations. In these ratings we observe the complexities of an instructional system as they are uncovered by the CEQ.

Another course, Pork Production 303, was taught during the 1969 spring semester providing the first opportunity to see how auto-tutorial and UNIVEX systems would work together for a graduate-level class.

In observing the sub-scores obtained from the Course Evaluation Questionnaire we find the course ranking in the 8th decile in general course attitude which was also the decile score for the instructor. However, the decile for method of instruction was at 3, which was two points below the all-University average. With all measurements considered, this particular course with this particular instructor and system rated better than the all-University average.

The students were taking the course at six educational centers throughout the state. At each center there was an auto-tutorial carrel tied into the instructional system with 10 auto-tutorial units assigned by the instructor. During the course we decided to document the use of these carrels as in a case study approach to see if the students were using the units and if so whether they were encountering any problems, and at the same time to get their evaluation. We noticed a great deal of difference in participation at the various centers. Eight of the units had been previously assigned by the instructor. One-sixth of the students had not on their own studied the units by that time. At Decatur the AT carrel was located in the Cooperative Extension adviser's office two miles away from the educational center. This definitely hindered the study of the AT units by the student. The students were not motivated to travel this distance. Again, the times that they could get access to the carrel were not appropriate times for them to study. Note that in the other locations half or more of the units had been studied where the auto-tutorial carrel was located at the educational center. This immediately leads us to conclude that the carrel must be located at the educational center for the convenience of the student.

Except for Decatur all locations were favorably inclined toward the need for auto-tutorial units in the course. For two locations, access to the auto-tutorial units was a limiting factor in studying them. Carrel equipment problems did not appear to hinder study except in one location. In regard to the question "I would not hesitate to enroll in another course using the same teaching methods." we found three locations favorably inclined with three locations not favorably inclined. At this time we could perceive the lower rating for the instructional method on the decile score mentioned above.

Also, during the spring semester Agricultural Law was taught. The instructor used the conventional system for 57 students on campus and the UNIVEX system for 31 students. All of the UNIVEX locations were averaged to represent the UNIVEX NET. These included the previously mentioned locations except Decatur. The Decatur location was so noisy and distrubing that the students travelled the extra distance to Urbana after the first week, to attend the course. In this case, the students were with the instructor in the UNIVEX terminal in Urbana. The instructor found this was very helpful to have the students right before him in conducting the class on the UNIVEX NET. Tests to check for significant differences were run between the UNIVEX NET group and the Urbana conventional classroom. The results indicated that the Urbana conventional classroom was rated significantly better than the UNIVEX NET as to (a) method of instruction, (b) student interest and attention and (c) the instructor. The UNIVEX NET was not preceived significantly different from the conventional classroom regarding (a) general course attitude (b) and course content. However, it should be noted that many instructors would be happy with the evaluation received by the UNIVEX system. Note that the rating for the method of instruction and course content was still above the average for all-University courses.

When analysing the course by location we note that the 10 students at Malta rated the course quite differently than the 21 at the other locations. We assume this Malta group interacted with the system quite differently than the other groups and therefore believe group dynamics play a big part in attitudes toward the net.

Achievement of the 31 students on the NET and the 57 conventional classroom students were almost identical. Three UNIVEX NET students made higher grades than any one on campus. The instructor observed that agricultural law can be effectively taught by the system. Much can be done to create "rapport" with the students and the lack of visual and personal contact tend to become less important as the course progresses. Adults such as those in this course are appreciative of the instructor's efforts, study their assignment surprisingly well, are attentive and interested and alert, and render a good account of themselves on quizzes and exams.

The employment of complex instructional systems to implement extramural teaching must be accompanied by valid research efforts which can evaluate the effectiveness of such systems. Until more effective research tools can be developed, the course evaluation questionnaires can provide information about general course attitude, method of instruction, course content, interest and attention, the attitude toward the instructor and other dimensions of the instructional system. When supported by case study methods which indicate the weaknesses and strengths of the system in specific detail, the research yields helpful insight about the instructional system.

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1. Spencer, Richard E. and Aleamoni, Lawrence M. "The Illinois Course Evaluation Questionnaire: A Description of Its Development and a Report of Some of Its Results" Research Report Number 292 (Urbana: Measurement and Research Division, Office of Instructional Resources, University of Illinois).
2. Tyler, R. W. "The Evaluation of Teaching." The Two Ends of the Log: Learning and Teaching in Today's College, ed. R. M. Cooper (Minneapolis: University of Minnesota Press, 1958), pp. 164-176.
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ILLINOIS COURSE EVALUATION QUESTIONNAIRE — FORM 66

Measurement and Research Division, Office of Instructional Resources, UNIVERSITY OF ILLINOIS ©By Richard E. Spencer

INFORMATION

STUDENT NUMBER 1 2 3 4 5 6 7 8 9

EXPECTED GRADE IN THIS COURSE

ARE YOU: MALE FEMALE

IS THIS COURSE REQUIRED ELECTIVE

TODAY'S DATE: MO DAY YR

COURSE CODE

MARK YOUR COLLEGE: AGRIC. COMM. & BA EDUC. ENGIN. F.& APP.ARTS HOME EC JOURN. COMM. LAS LAW PHYS.ED. MEDICINE NURSING PHARMACY DENTISTRY VET.MED. OTHER

CAMPUS LOCATION: URBANA CHI.CIR. MED.CEN. EXTENSION OTHER

ARE YOU: FRESHMAN SOPHOMORE JUNIOR SENIOR GRAD. OTHER

SAMPLE MARKS:

USE PENCIL ONLY

a) b) c) d)

RESPONSE CODE:

MARK SA IF YOU STRONGLY AGREE WITH THE ITEM

MARK A IF YOU AGREE MODERATELY WITH THE ITEM

MARK D IF YOU DISAGREE MODERATELY WITH THE ITEM

MARK SD IF YOU STRONGLY DISAGREE WITH THE ITEM

I learn more when other teaching methods are used.
It was a waste of time.
Overall, the course was good.
The textbook was very good.
The instructor seemed to be interested in students as persons.
More courses should be taught this way.
The course held my interest.
I would have preferred another method of teaching in this course.
It was easy to remain attentive.
The instructor did not synthesize, integrate or summarize effectively.
Not much was gained by taking this course.
The instructor encouraged the development of new viewpoints and appreciations.
The course material seemed worthwhile.
It was difficult to remain attentive.
Instructor did not review promptly and in such a way that students could understand their weaknesses.
Homework assignments were helpful in understanding the course.
There was not enough student participation for this type of course.
The instructor had a thorough knowledge of his subject matter.
The content of the course was good.
The course increased my general knowledge.
The types of test questions used were good.
Held my attention throughout the course.
The demands of the students were not considered by the instructor.
Uninteresting course.
It was a very worthwhile course.
Some things were not explained very well.
The way in which this course was taught results in better student learning.
The course material was too difficult.
One of my poorest courses.
Material in the course was easy to follow.
The instructor seemed to consider teaching as a chore or routine activity.
More outside reading is necessary.
Course material was poorly organized.
Course was not very helpful.
It was quite interesting.
I think that the course was taught quite well.
I would prefer a different method of instruction.
The pace of the course was too slow.
At times I was confused.
Excellent course content.
The examinations were too difficult.
Generally, the course was well organized.
Ideas and concepts were developed too rapidly.
The content of the course was too elementary.
Some days I was not very interested in this course.
It was quite boring.
The instructor exhibited professional dignity and bearing in the classroom.
Another method of instruction should have been employed.
The course was quite useful.
I would take another course that was taught this way.

IF PART II OR III IS TO BE USED MARK HERE →

COMPLETE SECTIONS BELOW ACCORDING TO YOUR INSTRUCTOR'S DIRECTIONS:

OPTIONAL PART II ITEMS 51-75

OPTIONAL PART III ITEMS 76-100

ERIC Clearinghouse on Adult Education FEB 25 1970

(SEE SAMPLE MARK AND RESPONSE CODE) ESPONSE PER ITEM.

2. COMPLETE INDENTIFICATION INFORMATION TO THE RIGHT.
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